

Unit Exam

PHYSICS 1 (HONORS)

PROJECTILE MOTION

NAME:

Equations:

$$x = x_o + v_o t + \frac{1}{2}at^2$$

$$v = v_o + at$$

$$v^2 = v_o^2 + 2ax$$

Problem 1.(5 points.) A projectile is launched with an initial velocity $v_o = 10$ m/s at an angle of $\theta = -30^\circ$ with the horizontal. Find the initial velocity in the x and y direction ($v_{o,x}$ and $v_{o,y}$ respectively).

Problem 2.(10 points.) A pelican flying along a horizontal path drops a fish from a height of $y_o = 10$ meters above the surface of the water. The fish travels 15 meters horizontally before striking the surface of the water.

Problem 3.(10 points.) A golfer hits a golf ball at an angle of $\theta = 25^\circ$ relative to the horizontal. If the golf ball covers a horizontal distance of $x = 301.5$ meters, what is the ball's maximum height?

Problem 4.(10 points.) A football quarterback throws a pass to a receiver at an angle of $\theta = 25^\circ$ to the horizontal and at an initial velocity of $v_o = 25$ m/s. The receiver is initially at rest $x = 30$ m from the quarterback. The instant the ball is thrown, the receiver accelerates away from the quarterback. What must his acceleration be in order for him to catch the ball?

Problem 5.(10 points.) An object is launched from the ground with an initial velocity and angle such that the maximum height achieved is equal to the total range of the projectile. Find the tangent of the launch angle:

Problem 6.(5 points.) In your own words describe the "bullet shot/ bullet dropped" theory. Why is this important to the study of projectiles?